

Trig 3.5

Determine whether a function is continuous

Identify end behavior of a function

Determine whether a function is increasing or decreasing on an interval

continuous

discontinuous

end behavior (*algebra 2*)

increasing

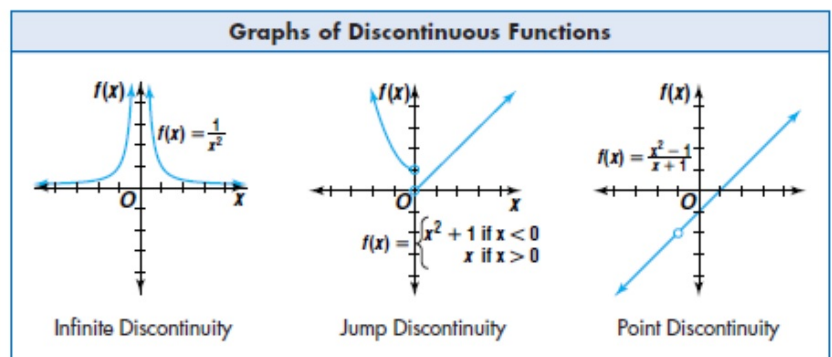
decreasing

interval

infinite discontinuity

jump discontinuity

point discontinuity



graphing calculators__table

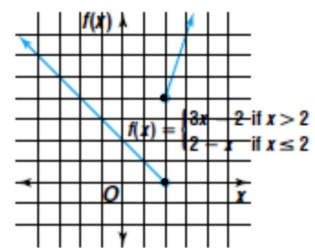
**Continuity on
an Interval**

A function $f(x)$ is continuous on an interval if and only if it is continuous at each number x in the interval.

Where did they ask you to look?

@ $x=0$ yes

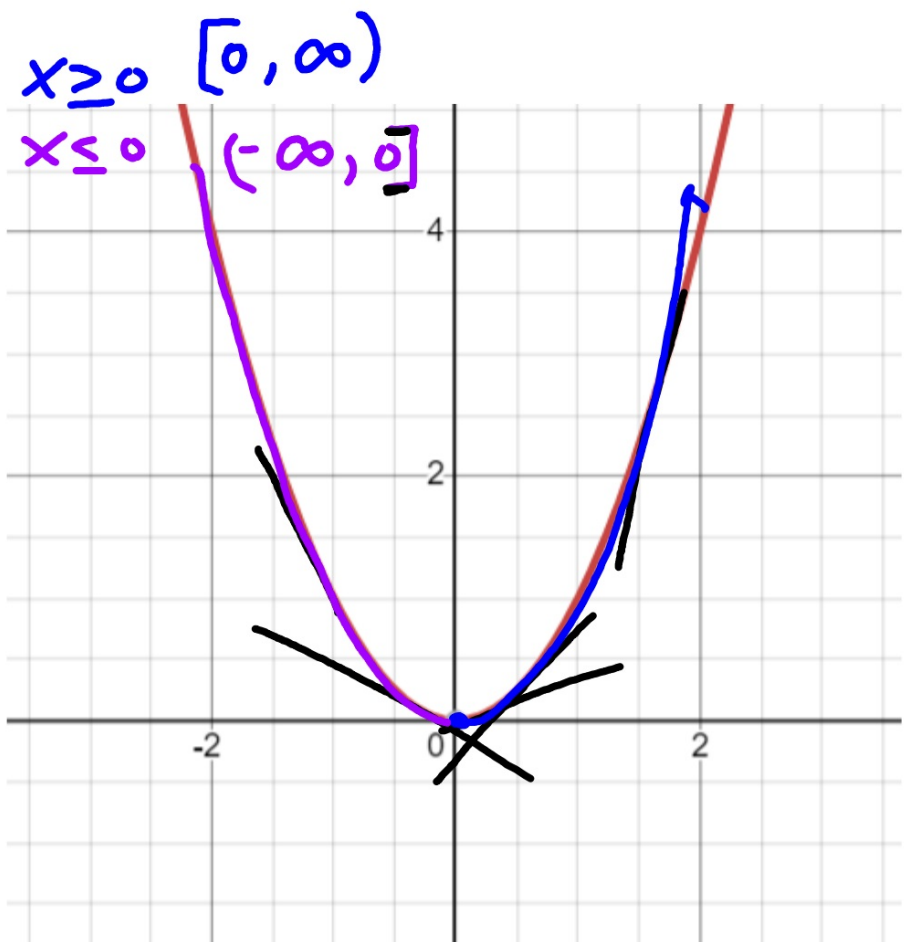
@ $x=2$ no



Related to slope...
Increasing function
Decreasing function
(can be 0 at times)

Slope is changing
because nonlinear

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decr. $(-\infty, \infty)$

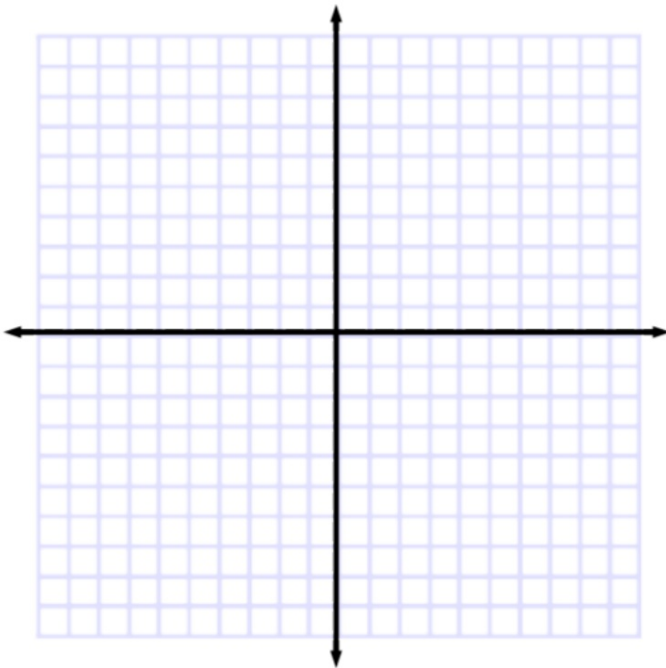
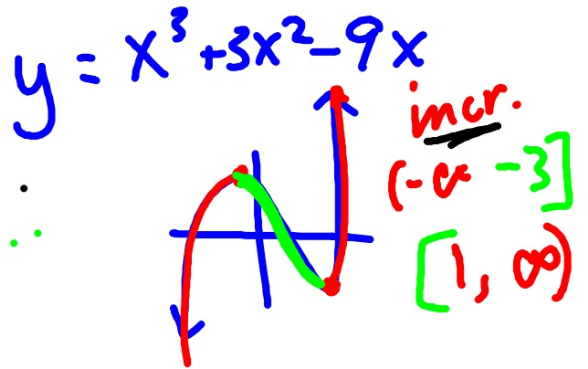
Graph each function. Determine the interval(s) for which the function is increasing and the interval(s) for which the function is decreasing.

26. $y = x^3 + 3x^2 - 9x$

27. $y = -x^3 - 2x + 1$

* Interval notation
open/closed

decr.
 $(-3, 1)$



Graphing calc?

4 Graph each function. Determine the interval(s) on which the function is increasing and the interval(s) on which the function is decreasing.


a. $f(x) = 3 - (x - 5)^2$

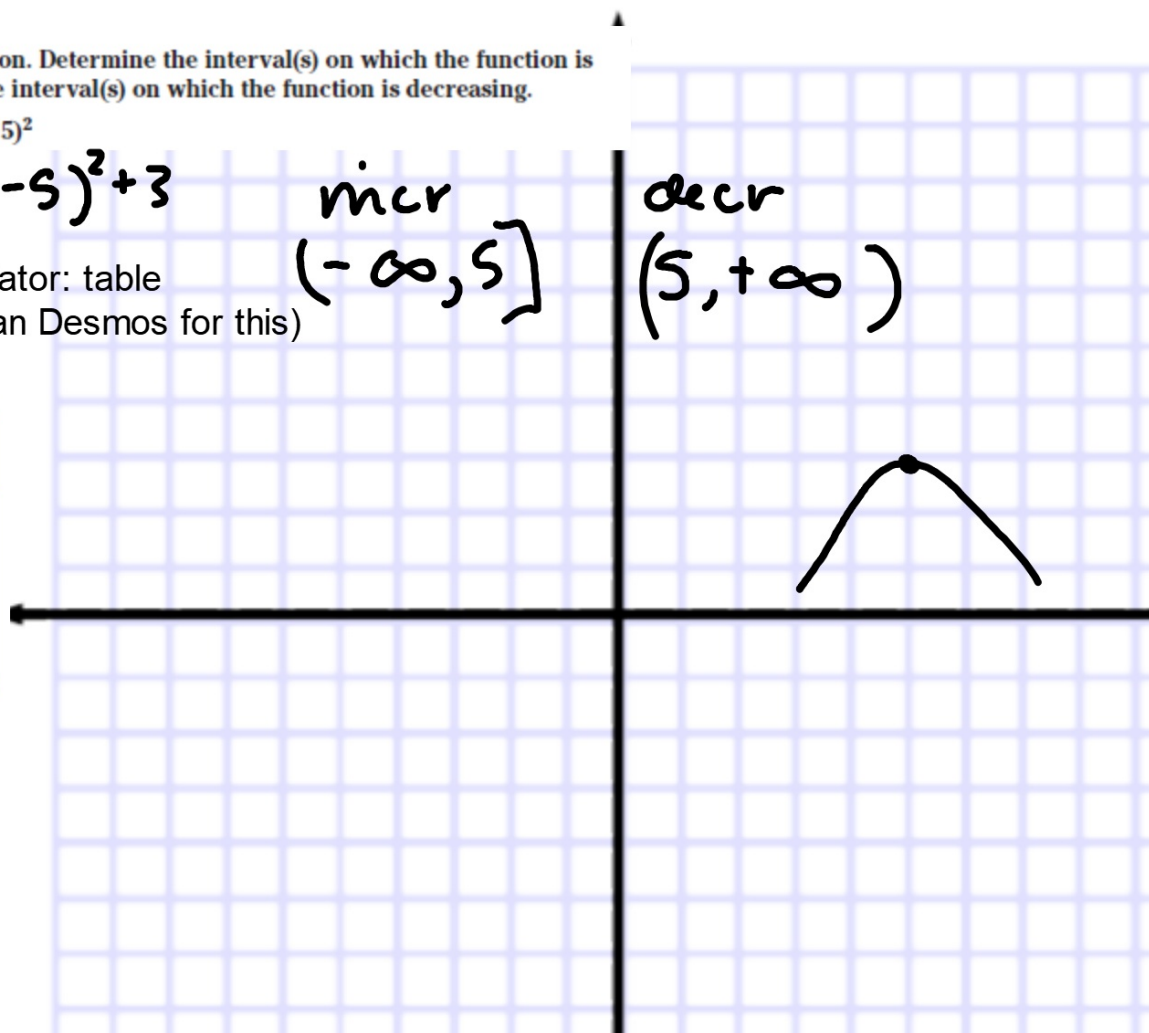
$$= -(x - 5)^2 + 3$$

incr
 $(-\infty, 5]$

decr
 $(5, +\infty)$

Graphing calculator: table
(gc is easier than Desmos for this)

 **Graphing Calculator Tip**
By watching the x - and y -values while using the TRACE function, you can determine approximately where a function changes from increasing to decreasing and vice versa.



14. $f(x) = \frac{x+3}{(x-3)^2}; x = -3$

Continuous?

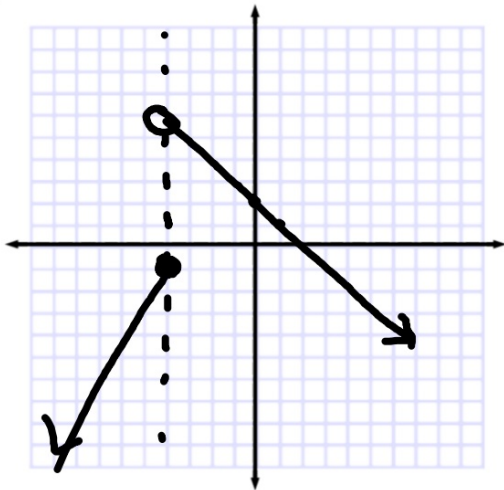
$$f(-3) = \frac{-3+3}{(-3-3)^2} = \frac{0}{36} = 0$$

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16. $f(x) = \begin{cases} 3x + 5 & x \leq -4 \\ -x + 2 & x > -4 \end{cases}; x = -4$

Continuous?

$y = 3x + 5$ $y = -x + 2$

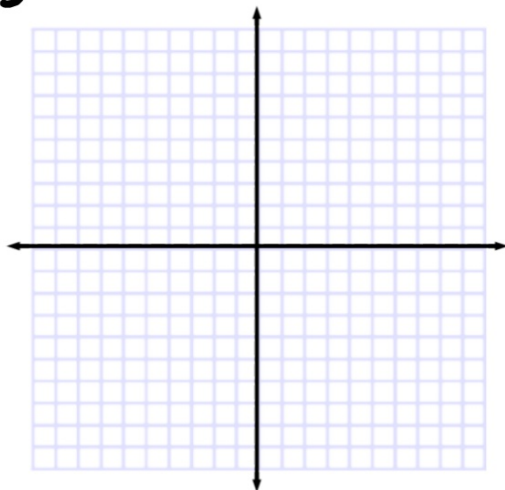


Describe the end behavior

20. $y = x^3 + 2x^2 + x - 1$

$y \rightarrow \infty$ if $x \rightarrow \infty$

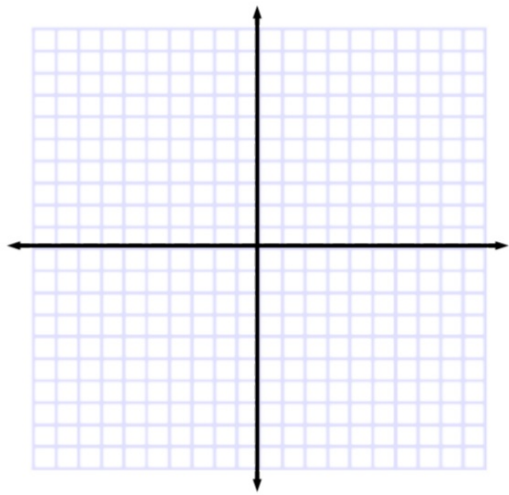
$y \rightarrow -\infty$ if $x \rightarrow -\infty$



22. $f(x) = x^{10} - x^9 + 5x^8$

$f(x)$
 $y \rightarrow \infty$ if $x \rightarrow -\infty$

$f(x)$
 $y \rightarrow \infty$ if $x \rightarrow \infty$



28. $f(x) = \frac{1}{x+1} - 4$

decr.
 $(-\infty, -1)$
 $(-1, \infty)$

$$\frac{1}{x}$$

WB 3.5

